EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1	"6281933".PN.	USPAT; USOCR	OR	ON	2007/05/08 13:35
L2	1	"6269195".PN.	USPAT; USOCR	OR	ON	2007/05/08 13:53
L5	1	("6006231").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/08 14:03
L6	1	("5490246").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/08 14:04
L7	0	"2003174136".pn.	US-PGPUB; USPAT	OR	ON	2007/05/08 14:04
L8	0	"2003/174136".pn.	US-PGPUB; USPAT	OR	ON	2007/05/08 14:04
L9	0	2002/118217	US-PGPUB; USPAT	OR	ON	2007/05/08 14:05
L10	0	2002/118217.pn.	US-PGPUB; USPAT	OR	ON	2007/05/08 14:05
L11	1	"1383080"	EPO	OR	ON	2007/05/08 14:06
L12	0	02/09039	USOCR; FPRS; EPO	OR	ON	2007/05/08 14:06
L13	0	"0694879"	EPO	OR	ON	2007/05/08 14:06
L14	0	"3694879"	EPO	OR	ON	2007/05/08 14:06
L15	1	"694879"	EPO	OR	ON	2007/05/08 14:11
L16	9	(("6,580,430") or ("5,949,409") or ("6,211,890") or ("6,707,462") or ("5,388,201") or ("6,489,963") or ("6,577,317") or ("6,466,218") or ("6,031,937")).PN.	US-PGPUB; USPAT	OR	OFF	2007/05/08 14:14
L17	13	(("20020093516") or ("6,166,748") or ("6,526,174") or ("5,933,148") or ("6,614,444") or ("6,664,958") or ("6,452,600") or ("6,697,074") or ("6,571,328") or ("6,246,418") or ("6,369,823") or ("6,456,290") or ("6,664,962")).PN. or (2003/0123739).CCLS.	US-PGPUB; USPAT	OR	OFF	2007/05/08 14:15
L18	14	(("20020093516") or ("6,166,748") or ("20030123739") or ("6,526, 174") or ("5,933,148") or ("6,614, 444") or ("6,664,958") or ("6,452, 600") or ("6,697,074") or ("6,571, 328") or ("6,246,418") or ("6,369, 823") or ("6,456,290") or ("6,664, 962")).PN.	US-PGPUB; USPAT	OR	OFF	2007/05/08 14:17

EAST Search History

L19	11	(("6,369,830") or ("6,639,595") or ("6,411,301") or ("5,793,376") or ("6,636,214") or ("6,421,058") or ("20020174181") or ("6,618,048") or ("6,609,977") or ("6,424,348") or ("6,075,543")).PN.	US-PGPUB; USPAT	OR	OFF	2007/05/08 14:20
L20	2	("9845815").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/05/08 14:21
L21	5	("2004027707").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/05/08 14:21
L22	0	("0972273").PN.	EPO	OR	OFF	2007/05/08 14:21
L23	0	("0972273").PN.	EPO	OR	OFF	2007/05/08 14:21
L24	0	("0972273").PN.	EPO	OR	OFF	2007/05/08 14:22
S1	1	("20050232507").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/03 14:41
S2	10	ZIMMER-MARK	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 14:50
S3	1	ZIMMER-MARK-A	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 14:51
S4	3	ZIMMER-MARK-ALAN	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 14:52

EAST Search History

S5	10	ZIMMER-MARK-D	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 14:52
S6	993	382/260.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 14:57
S7	466	382/264.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 14:57
S8	68	S6 and S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:01
S9	25	S8 and gaussian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:09
S10	0	bklur same kernel and gaussian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:09
S11	123	blur same kernel and gaussian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:09

EAST Search History

S12	1	S8 and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:16
S13	3	primary adj1 kernel same weight$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:33
S14	75	horizontal and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:18
S15	74	vertical and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:18
S16	2	S13 not S15	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:18
S17	4	graphics adj1 processing adj1 unit and S11	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:21
S18	0	graphics adj1 processing adj1 unit and S8	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:22

EAST Search History

S19	1	S17 and S7	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 15:22
S20	3	primary adj1 kernel same weight$4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:33
S21	2	S20 and compute	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:33
S22	4	primary adj1 kernel and compute	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:35
S23	5423444	apply$4 or employ$4 or enforc$4 or implement$4 same blur and image	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36
S24	993	382/260.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36
S25	466	382/264.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36

EAST Search History

S26	68	S24 and S25	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36
S27	58	S23 and S26	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36
S28	123	blur same kernel and gaussian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36
S29	1	S27 and S28	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 16:36
S30	22	S27 and gaussian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 17:02
S31	305	fragment adj1 program$	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 17:02
S32	0	S26 and S31	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 17:02

EAST Search History

S33	0	S24 and S31	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 17:03
S34	2	S31 and S25	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 17:05
S35	54	GPU and S31	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/03 17:06
S36	54	GPU and S31	US-PGPUB; USPAT; DERWENT	OR	ON	2007/05/03 17:06
S37	4	GPU and S31	USPAT	OR	ON	2007/05/03 17:08
S38	0	S31 and S28	USPAT	OR	ON	2007/05/03 17:08
S39	70	S31 and S23	USPAT	OR	ON	2007/05/03 17:09
S40	0	S39 and S26	USPAT	OR	ON	2007/05/03 17:08
S41	0	S39 and 348/597.ccls.	USPAT	OR	ON	2007/05/03 17:12
S42	0	S39 and 382/264.ccls.	USPAT	OR	ON	2007/05/03 17:12
S43	0	S39 and 382/260.ccls.	USPAT	OR	ON	2007/05/03 17:13
S44	215	blur and comput$5 same kernel	USPAT	OR	ON	2007/05/03 17:13
S45	146	S44 and motion	USPAT	OR	ON	2007/05/03 17:13
S46	83	S44 and gaussian	USPAT	OR	ON	2007/05/03 17:13
S47	56	S46 and motion	USPAT	OR	ON	2007/05/03 17:15
S48	91	blur SAME kernel	USPAT	OR	ON	2007/05/03 17:56
S49	4	"6717599"	USPAT	OR	ON	2007/05/03 17:56
S50	1	("6717599").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/03 17:57
S51	1	("6272558").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/03 17:58
S52	1	("5490246").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/03 17:58
S53	1	("6987530").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 11:23

EAST Search History

S54	1	("6628329").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 16:15
S55	1	("6369830").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 16:16
S56	1	("6639595").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 16:17
S57	1	("6411301").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 16:18
S58	1	("5793376").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 16:19
S59	1	("6636214").PN.	US-PGPUB; USPAT	OR	OFF	2007/05/07 17:20
S60	123	blur same kernel and gaussian	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/07 17:21
S61	48	S60 and weight	US-PGPUB; USPAT	OR	ON	2007/05/07 17:24
S62	466	382/264.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/05/07 17:24
S63	80	S62 and kernel	US-PGPUB; USPAT	OR	ON	2007/05/07 17:25
S64	80	S62 and kernel$	US-PGPUB; USPAT	OR	ON	2007/05/07 17:25

Abstract

Proceedings of SPIE -- Volume 3521
Machine Vision Systems for Inspection and Metrology VII, Bruce G. Batchelor, John W. V. Miller, Susan S. Solomon, Editors, October 1998, pp. 334-341

Efficient algorithm for Gaussian blur using finite-state machines

Frederick M. Waltz
Consultant (USA)

John W. V. Miller
Univ. of Michigan/Dearborn (USA)

2D Gaussian blur operations are used in many image processing applications. The execution times of these operations can be rather long, especially where large kernels are involved. Proper use of two properties of Gaussian blurs can help to reduce these long execution times: (1) Large kernels can be decomposed into the sequential application of small kernels. (2) Gaussian blurs are separable into row and column operations. This paper makes use of both of these characteristics and adds a third one: (3) The row and column operations can be formulated as finite-state machines to produce highly efficient code and, for multi-step decompositions, eliminate writing to intermediate images. This paper shows the FSM formulation of the Gaussian blur for the general case and provides examples. Speed comparisons between various implementations are provided for some of the examples. The emphasis is on software implementations, but implementations in pipelined hardware are also discussed. Straightforward extensions of these concepts to 3- and higher-dimensional image processing are also presented. Implementation techniques for DOG (Difference-of-Gaussian filters) are also provided.

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